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Agricultural Technology Opportunities.

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Agricultural education programs available through North Carolina's newly created system of industrial education center, technical institutes, and community colleges are described. The information is for use by administrators, and teachers of adult agricultural courses and counselors of high school dropouts and graduates. It describes the need for and organization of career programs, short courses, and upgrading courses and the relationship of high school vocational agriculture to post-secondary agricultural technology institutions. Major topics are (1) The Importance of Training for Agricultural Occupations, (2) Agricultural Technology Education, (3) Specific Occupational Short Courses for Training Technical Specialists, which describes customs praying, nursery practices, and tobacco grading and marketing, (4) Upgrading Courses for Workers in Non-Farming Agricultural Occupations, which includes pesticides, poultry feeding and management, swine feeding and management, advanced dairy technology, fertilizers and lime, liquid fertilizer application, grain marketing practices, farm engine electrical systems, farm tractor hydraulic systems, oil burner maintenance, and feed mill management, operation, and maintenance, and (5) The Interrelationship of Vocational Agriculture and Agricultural Technology Education. (WB)



AGRICULTURAL TECHNOLOGY OPPORTUNITIES

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AGRICULTURAL TECHNOLOGY OPPORTUNITIES .

Career Programs
Short Courses
Upgrading Courses
Relationship to Vo-Ag

3 Agricultural Technology Education .>
Vocational-Technician Division
Department of Community Colleges
3 State Board of Education,
3 Raleigh, 3 North Carolina

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PREFACE

North Carolina's agriculture is big business with an increasing demand for the young person with an agricultural background. In North Carolina, as elsewhere, agriculture is undergoing a technological revolution requiring greater technical competence among workers in the agriculture-related occupations.

This booklet explains agricultural education programs available through North Carolina's newly created system of industrial education centers, technical institutes and community colleges to meet this rapidly increasing educational need. The contents should be especially useful to: (1) administrators and teachers of the agricultural courses for adults in these relatively new educational institutions, and (2) vocational agriculture teachers and others responsible for counseling high school graduates and dropouts.

It describes the need for and organization of career programs, short courses, and upgrading courses, and the relationship of high school vocational agriculture with agricultural technology instruction beyond high school. This bulletin should help all concerned with providing additional educational opportunities for farm youth and others who are planning careers in agriculture as well as for individuals already employed in the field of agriculture.

I. E. Valentine

I. E. Valentine, Assistant Director
Vocational-Technician Division

IMPORTANCE OF TRAINING FOR AGRICULTURAL OCCUPATIONS

Agriculture is a growing, dynamic, national industry. About 40 per cent of the work force in the United States is in producing, processing, and marketing farm products, and in providing supplies and services to farmers. With an expanding population — 8,200 new mouths each day in our country — agricultural occupations will continue to be extremely important in the national economy.

Agricultural occupations are changing. Due to agricultural technology, farm production is increasing rapidly. A result is the need for fewer farmers. Agriculture is a highly competitive field, and, because of the technological revolution in agriculture, agricultural workers of the future must possess greater technical competence. Hence, a higher level of education for agricultural workers is required including so-called "general" education as well as vocational education in agriculture in high school and after high school. Career preparation for the new agricultural technology cannot stop with high school, nor can farming be regarded as the only occupational goal for youth interested in agricultural careers. To explain the expanding career fields and their requirements, vocational guidance is needed for both high school students and adults.

Increased agricultural production and increased consumption of agricultural products have resulted in a vast, new area of opportunities in non-farming agricultural occupations. These opportunities lie chiefly in the fields of marketing and processing agricultural products, in supplying equipment and technical services to farmers, and in providing professional agricultural services. In the United States, almost three times as many people are employed in these non-farming agricultural occupations as are employed in farming. Thus, in addition to the opportunities in farming, opportunities exist in increasing numbers in the field of agriculture.

In terms of training required, agricultural occupations call for skilled workers, technicians, and professionals. The need for the untrained worker is decreasing rapidly. The need for trained workers in agriculture is a part of the trend toward more technical competence in all industry activities.

Agricultural Technology Education, consisting of main career programs, short courses in certain occupations, and upgrading courses for persons already employed in agriculture, is provided for the needs of North Carolina and North Carolinians and is described in the following three main parts of this publication.

I. AGRICULTURAL TECHNOLOGY EDUCATION

The purpose of this section is to describe the need, objectives, places of training, instructional staff, and the career preparation available in Agricultural Technology Education programs in North Carolina.

Need for Training for Technical Occupations in Agriculture

The demand for technically trained personnel in the non-farm agricultural fields is extremely great. In nine eastern North Carolina counties over 400 technically trained new employees were needed in 249 agricultural industry firms during the year 1960. The farm machinery industry rated at the top of the list in number of new or replacement employees needed.

To help meet North Carolina's needs for non-farming agricultural technicians, the 1961 North Carolina Legislature made funds available to initiate a program of Agricultural Technology Education beyond the high school level.

Objectives of Agricultural Technology Education

The major objective of Agricultural Technology Education is to prepare technicians in the non-farming agricultural occupations. Instruction is offered in six main areas:

- . Providing services for farmers
- . Furnishing equipment and supplies to farmers
- . Processing farm products
- . Storing farm products
- . Distributing farm products
- . Marketing farm products

Agricultural Technology Education may also provide in-service education opportunities for teachers of Vocational Agriculture, and other professional agricultural workers.

Place of Training

The pre-employment training of technicians in agricultural occupations is conducted mainly at an industrial education center, a technical insti-

tute, a community college, or at a strategically located extension unit of one of these institutions, depending on availability of instructional equipment and the convenience of the persons enrolling.

Some technical courses may be conducted in high school vocational agriculture departments after regular school hours, or at other suitable locations.

To assure that all parts of the State are served according to their demand for technicians, ten geographical areas are centered on industrial education centers, institutes, or community colleges in the counties of Wilson, Wayne, Lenoir, Pitt, Cumberland, Lee, Randolph, Catawba, Forsyth, and Buncombe. Each of these institutions has a coordinator of Agricultural Technology Education under the leadership of the institutional director. The coordinator takes the lead in surveying needs, organizing classes and courses, supervising the agricultural teaching staff, and planning and coordinating programs with the teachers of vocational agriculture and other educational leaders.

Teachers

Educational and experience requirements for all teachers are prescribed by the State Board of Education through the Department of Community Colleges. A teacher-training program in Agricultural Technology has been developed at North Carolina State College. In the future, this will supply the need for technical teachers. At present, teachers of special subjects may come from agricultural industries or from the educational field.

Kinds of Training

A person desiring to enroll in an agricultural technology curriculum should show an aptitude for the occupation for which the training prepares. A general aptitude test will be given to assist him in the selection of a course. A student may enroll for one of the pre-employment courses, ranging from a few months on a part-time basis to a full-time two year course.

The two-year programs which train for main career opportunities are described next.

MAIN CAREER PROGRAMS

Five main curriculums are offered presently, in the two-year full-time programs: business, chemicals, equipment, farm business management, and poultry and livestock. Each is described briefly in the following discussion.

Agricultural Technology - Business

Agricultural industries and businesses employ persons to assist in marketing, processing, and distributing farm products, and providing services to farmers. Many responsible positions in agricultural industries and businesses require technical training not available in high schools or in four-year colleges.

The Agricultural Technology—Business curriculum is designed to help students acquire knowledge, skills, understandings, and abilities in the broad field of agricultural business. This training combines knowledge of agriculture with business practice to prepare the graduate for a cluster of employment opportunities in agricultural business.

The business curriculum includes agricultural economics, animal science, plant science, accounting, sales development, business machines and such general subjects as human relations, English, and technical writing.

Career opportunities include such positions as: farm supply store manager, field serviceman, salesman, feed company plant manager, and marketing firm office manager.

Agricultural Technology - Chemicals

The growing agricultural chemical industry supplies thousands of dusts, sprays, and granules to farmers for controlling pests—and a huge variety of fertilizer materials to make crops profitable and keep farm animals and flocks healthy. Agricultural chemicals are utilized in production of all kinds of crops and livestock.

The Agricultural Technology—Chemicals curriculum prepares students for the rapidly growing fields of agricultural chemicals development, testing, production, selling, and utilization.

The student learns essential chemistry, entomology, animal science, plant science, livestock diseases and parasites, plant pathology, pesticide application and safeguards, and companion business subjects including English, speech, human relations, and selling.

Each phase of the agricultural chemicals industry offers employment opportunities for technically trained individuals in sales, research, production and manufacturing, management and custom farm application. Positions are available in the larger companies as well as in the smaller farm supply businesses. New uses for agricultural chemicals are developing rapidly, creating challenging and well-paying jobs.

Career opportunities include such positions as: wholesale dealer, retail dealer, formulator, salesman, and custom applicator.

Agricultural Technology - Equipment

Manufacturing, distributing, selling, servicing and repairing agricultural equipment offer challenging opportunities in today's mechanized agriculture.

General adoption and widespread use of modern machinery have created numerous employment opportunities in production, manufacturing, sales, service, finance, distribution, installation, and maintenance of agricultural equipment.

The Agricultural Technology—Equipment curriculum is designed to help students acquire knowledge, understandings, skills, and abilities needed in the agricultural equipment field.

The student gets well-rounded experience in drafting and blueprint reading, gasoline and diesel engines and electrical systems, tractors and farm machinery, welding, and related technical mathematics, sales development, supported by background knowledge in physics, English and human relations.

Graduates of this curriculum are in demand by manufacturers, distributors and service firms for sprayers, pumps, fuels and lubricants; livestock equipment; farm building supplies; and farm machinery sales and service.

Note: A shorter Farm Machinery curriculum is offered for one year

by several centers and is aimed at training servicemen for employment in the farm machinery industry.

Career opportunities include such positions as: farm equipment dealer, serviceman, partsman, foreman, manager, and salesman.

Agricultural Technology - Farm Business Management

Farming is undergoing tremendous changes. The trends are to larger, highly mechanized and specialized farms with huge capital investments. This means that there will be an increasing demand for capable farm managers to coordinate the purchasing, producing and marketing of these larger agricultural operations.

Farm managers who will succeed must possess greater technical competence in a highly competitive farming market. They must recognize present production problems and adapt to new methods and new varieties of crops.

The trend towards larger farming operations with increasing non-farm control of production means there will be greater employment opportunities for well-trained individuals who can efficiently and profitably supervise the production and marketing of agricultural products.

Changes in agriculture and the general economic environment are occurring at a faster rate. Profitable management of agricultural operations will demand ability to see the need for changes and to take advantage of changing market conditions, besides fundamental farming ability. The power of decisions depends on knowledge and the ability to put that knowledge into practice.

The Agricultural Technology—Farm Business Management curriculum includes soil science, plant science, animal science, poultry and livestock, agricultural business operations, farm mechanization, and closely related English, human relations and mathematics.

Graduates of this curriculum who enter business firms will very often be directly associated with production of agricultural products, often in marketing and processing work with farmers.

Career opportunities include such positions as: farm manager, agricultural business representative, and food processing fieldman.

Agricultural Technology - Poultry and Livestock

Growing, processing and marketing of poultry and livestock and associated products furnishes employment for a very large number of qualified persons in grading, marketing, inspecting, processing and distributing of these products.

Improved methods and mechanizations in the poultry and livestock industries in North Carolina require technically trained people. Advanced techniques and skills are needed in the producing, processing, storing and marketing of poultry and livestock and their products.

The Agricultural Technology—Poultry and Livestock curriculum is designed to give students a good understanding of the principles, methods, techniques and skills essential for a successful career in the poultry and livestock industries.

The student learns in depth the essentials of poultry science, housing, marketing and health; animal science; dairy and beef production, swine and sheep production; farm chemicals; sales development and such general subjects as English, physics, chemistry and human relations.

Career opportunities include such positions as: livestock fieldman, poultry fieldman, equipment salesman, feed salesman, flock manager and herd manager.

The next part of this publication covers short courses for preparation of certain technical specialists in the agricultural occupations.

II. SPECIFIC OCCUPATION SHORT COURSES FOR TRAINING TECHNICAL SPECIALISTS

Short courses are offered to provide training needed for specific jobs. These courses vary in length from six months to one year. Attendance may be part-time rather than full-time. The following discussion is on the short courses in custom spraying, nursery practices, and tobacco grading and marketing. Other courses may be offered when demand exists; persons interested should inquire at the nearest center, institute, or community college.

Custom Spraying

Many farmers prefer to have a specialist help solve problems of insects, plant diseases and weeds, and to apply fertilizers. Some application equipment is too costly and specialized for each farmer to purchase. Therefore, custom spraying and dusting in North Carolina is big business.

The course for custom sprayers includes identifying and controlling: insect pests, plant nutritional deficiencies and diseases and weeds; formulating pesticides; and calibrating and operating spray applicators.

The nature of the work can vary from helping farmers with insect problems to applying liquid nitrogen to crops. Graduates of this course can perform such jobs as spraying and dusting crops, spraying beef or dairy cattle for control of flies, lice and grubs; selling and applying anhydrous ammonia and other fertilizers, and pesticides, and providing technical advice to farmers.

Nursery Practices

Demand in North Carolina for nursery and greenhouse products is increasing. The services of many technically trained people are needed in the propagation, culture, and sale of cut flowers, potted plants, and trees and shrubs.

The course includes plant propagation, nursery practices, greenhouse practices, and identification and control of insects and diseases of

ornamental plants. The student will learn to operate and care for the various types of equipment used in nursery work.

The work may include supervising and participating in cultivating trees, shrubs, and flowers in a nursery or greenhouse; propagating plants from cuttings or by grafting, layering and dividing; mixing soil, moss or other ingredients for plant beds; spraying or dusting plants with insecticides; pruning; regulating greenhouse temperatures and humidity; and other duties requiring knowledge and skill in nursery work.

Tobacco Grading and Marketing

The huge tobacco industry in North Carolina requires many highly trained people who know tobacco grades, warehouse procedures, selling practices and methods of handling and storing tobacco. The course covers these activities thoroughly. Training is given in the fundamentals of U. S. Official Standard Grades. All factors of official grades are learned, including, group, quality, and color.

Career opportunities for a trained tobacconist include leaf manager for sales warehouse, sales manager, speculator, and related occupations. With additional special training one might qualify for tobacco inspector's aide or tobacco commodity grader.

The next discussion covers short courses designed specifically for upgrading employed workers.

III. UPGRADING COURSES FOR WORKERS IN NON-FARMING AGRICULTURAL OCCUPATIONS

These courses are tailored to fit the needs of the particular group of employed specialists who sign for each offering. Other upgrading courses are available on demand.

Pesticides (30 hours)

For retail salesmen and others who advise farmers on the use of pesticides, this course develops thorough knowledge of pesticides and their purposes, and understanding of proper application and safety measures, with detailed, specific information concerning pesticides for tobacco, cotton, corn, small grain, vegetable crops, fruits, ornamental crops and livestock.

Poultry Feeding and Management (60 hours)

This course for poultry fieldmen, emphasizes local problems, covering general poultry production principles, brooding, rearing, managing, selecting stock; housing and equipment; poultry health, including preventive measures, diagnosing and controlling diseases and parasite troubles; and nutrition.

Swine Feeding and Management (30 hours)

Swine fieldmen who work with producers learn new developments in the swine industry; confinement rearing, systems of hog production, manure disposal; swine management, breeding and feeding; diseases; and automation, housing and marketing.

Advanced Dairy Technology (30 hours)

Chemical and bacteriological methods used in the technical control of milk, for dairy plant specialists.

Fertilizers and Lime (30 hours)

Fertilizer handlers receive intensive instruction in economics of fertilizers and lime usage; plant growth and nutrient requirement; various kinds of nitrogen, phosphorous and potassium fertilizers, secondary and trace elements, mixed fertilizers, farm manures and plant residues, liming materials; inspection and control, and soil testing.

Liquid Fertilizer Application (30 hours)

For liquid fertilizer handlers and custom applicators, this course covers types and characteristics of liquid fertilizers; procedures for applying; calibration of applicator equipment; custom application.

Grain Marketing Practices (30 hours)

For grain buyers, warehousemen, elevator operators and grain processors, the instruction provides a working knowledge of modern grain marketing and merchandising practices—grain harvesting practices, grain handling and storage equipment, commercial storage practices, grain loan and storage programs, marketing grain on quality standards, transportation in the grain industry, and marketing and merchandising.

Farm Engine Electrical Systems (20 hours)

For servicemen in the farm machinery industry—battery maintenance, cranking motor service and troubleshooting, quick-check of generator-regulator system, check and adjustment of Auto-Lite and Delco-Remy regulators, generator troubleshooting, generator service, ignition testing instruments and service, and switches.

Farm Tractor Hydraulic Systems (20 hours)

Servicemen in the farm machinery industry learns hydraulic principles; hydraulic pumps, valves, cylinders, seals and packing, lines and fittings; hydraulic system troubles; hydraulic transmissions; hydraulic fluids; system maintenance and troubleshooting.

Oil Burner Maintenance (30 hours)

For oil burner sales and service personnel—vaporization and pressure atomization; combustion testing; working from simple diagrams; using simple test equipment; fuel pumps and nozzles; installation and service problems.

Feed Mill Management, Operation and Maintenance (30 hours)

For managers, operators and employees of feed mills—operating and maintaining feed mill machinery; feed values; feed formulas; blending feeds; storing, handling, inspecting and testing grain; sanitation practices; supervision; and governmental regulations and practices con-

cerning production, harvesting, storing and selling grain.

The final section of this publication shows the interrelationship of high school vocational agriculture offerings and agricultural technology instruction.

IV. THE INTERRELATIONSHIPS OF VOCATIONAL AGRICULTURE AND AGRICULTURAL TECHNOLOGY EDUCATION

The comprehensive agricultural education program in North Carolina requires that a close relationship be established between high school programs in Vocational Agriculture and adult programs of Agricultural Technology Education.

The Department of Community Colleges created by the North Carolina General Assembly of 1963 provides continuity of educational opportunity in agriculture beyond the high school, with instruction adapted to the needs of each area and locality of the state.

The facilities available at community colleges, technical institutes, and industrial education centers contribute strongly to the adult education program. The guidance of local advisory committees helps area education to meet educational needs.

High School Preparing for Agricultural Technology Education

From the standpoint of the high school or pre-high school student looking ahead, agricultural education programs may be pictured in the following manner:

<u>Agricultural Education</u>		
HIGH SCHOOL	POST HIGH SCHOOL	OCCUPATION
English	Young and Adult Farmer Education	Production
Math-Science	Agricultural Technology Education	Business
Social Studies		
Vocational Agric.	Agricultural College (4 yr.)	Professions

Vocational guidance during education	
Introduction to World of Work	Continuing guidance available from instructors

A high school vocational agriculture graduate may continue his education in agriculture in a technical training program for non-farming agricultural occupations through an industrial education center, a technical institute, or a community college, under programs supervised by the Department of Community Colleges. He may enter a senior college for a full-time preparation program requiring four or more years; or he may learn more about his occupation in his own community through a Young Farmer Program and adult agricultural education program offered by his high school's vocational agriculture department. An aim of all these programs is to coordinate with one another to give maximum preparation with minimum repetition for persons entering one level of training after participating in another.

Today, it is especially necessary to get students in all high school vocational programs to look ahead to further training, in the highly competitive field of agriculture. Technical competence is required. So that programs of agricultural education in the public schools can afford students with a look ahead to educational opportunity, a close cooperation of high school vocational agriculture and agricultural technology is necessary. Such a close working together will give the high school vocational agriculture student these things:

1. For high school students:
 - a. A look ahead in vocational guidance and in motivation.
 - b. Opportunity to participate profitably in Young Farmer Education Program and other education after finishing high school.
 - c. The chance to obtain technical training to enter the non-farming agricultural occupations.

SUMMARY

In summary, Agricultural Technology Education offers a much needed opportunity for:

- a. High school students to continue education after high school, leading to employment in the non-farming agricultural occupations.

- b. People engaged in the non-farming agricultural occupations to upgrade themselves in their occupational abilities.
- c. Vocational agriculture teachers and other persons desiring in-service education opportunities.

WHERE TO GET MORE INFORMATION

Additional information may be secured by writing the Agricultural Technology Education Section, Vocational-Technician Division, Department of Community Colleges, Raleigh, North Carolina. Information on offerings at industrial education centers may also be obtained from one of the following institutions.

Asheville-Duncombe Industrial
Education Center
340 Victoria Road
Asheville, North Carolina

Catawba County Industrial Education
Center
Newton
North Carolina

Fayetteville Industrial Education
Center
P. O. Box 5236
Fayetteville, North Carolina

Goldsboro Industrial Education
Center
P. O. Box 1259
Goldsboro, North Carolina

Lee County Industrial Education
Center
Route 2 Box 27
Sanford, North Carolina

Lenoir County Industrial Education Center
P. O. Box 1296
Kinston, North Carolina

Pitt County Industrial Education Center
P. O. Box 15
Greenville, North Carolina

Randolph Industrial Education Center
629 Industrial Ave., Industrial Park
Asheboro, North Carolina

Wilson Industrial Education Center
902 Herring Avenue
Wilson, North Carolina

Winston-Salem--Forsyth County Industrial
Education Center
2100 Link Road
Winston-Salem, North Carolina